

**The bio-century challenge: life in a holistic context.  
In conversation with Cornel du Toit**

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*Abstract*

My engagement in this article with the South African systematic theologian Cornel du Toit in recognition of his valued scholarship is restricted to only two of his contributions in the context of the science–theology debate. The first of these are his recent unpublished paper *Immanent transcendence and the nature of life: developments from Schrödinger to Kauffman* (April 2012) delivered in Tartu, Estonia. In this contribution Du Toit points towards a challenging way and direction in which reflection on life should be pursued, namely holistically in a bio-century. The second of Du Toit's contributions discussed in this article is his thoughts on life in *Values in the science–religion dialogue: biological roots of human nature and interaction with cultural environment*. Here he focuses on the biological roots of life-supporting values. I subsequently ask what specific theological contribution can be made to a redefinition of life in the context of the science–theology debate. In my conversation with Du Toit a brief account is given of his argument for a redefinition of life. Broad outlines are then given to suggest how theological thoughts about life can contribute to its redefinition. Lastly the case for the integration of the constitutive importance of affectivity in any effort to redefine life holistically is argued.

**Introduction**

“(T)here is a need to read the ‘more than’ into the story ...”  
(Du Toit 2012:54).

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To engage in celebrating the scholarly contribution of the South African systematic-theologian Cornel Du Toit is a pleasant undertaking. Pleasant, since his academic reflections and contributions, which span more than 30 years and cover a wide spectrum of topics – ranging from reflection on African rationality and Black consciousness to the science–theology debate to secular spirituality and theological-philosophical issues – have always been explorative and inviting. Du Toit continuously challenges traditional boundaries and opens new avenues of reflection. His work is inviting, because it leaves spaces for ongoing dialogue with other scholars and sets new contextual challenges. His main scholarly contribution – on which I will focus – was made in the context of the science–theology debate.

There are at least three characteristic of his contributions to this debate that I wish to single out. The first is the manner in which he addresses, explicitly and implicitly, the three most common clichés (cf. Polkinghorne & Welker 2000:3) that hamper the constructive debate between the sciences and theology, namely: **that** theology deals with realities unseen whereas the sciences deal with visible realities; **that** theological reflection only deals with feelings whereas the sciences strictly deal with facts; and **that** theology primarily deals with personal certainty whereas the sciences clearly deal with objective truths. Du Toit denounces these clichés in various ways over the wide spectrum of his scholarly activity. To give just one example: in his foreword to *Viewed from the shoulders of God* Du Toit (2007:vi) remarks that the “aim of the science–religion debate is not to ‘rescue’ religion from science” since the “gods don’t need protection, they speak for themselves”. He then continues:

It is difficult to tell whether we have made any progress in the science–religion debate. Both domains are diversified and neither can speak on behalf of the other. Science and religion cannot be united or separated, nor can one be subordinated to the other. Interaction is necessary in view of the boundaries between them ... We know that both science and religion grapple with reality, albeit in different ways. One cannot say that one picture of reality is more real or legitimate than the other. Reality is multidimensional. Religious reality can be more real than any scientific fact and many scientific theories are metaphysically determined. Reality has different faces; science and religion are two of them, and which science and religion deal with in their own distinctive ways (Du Toit 2007:10).

The second characteristic of Du Toit's contributions is his deep and ongoing commitment to the distinctive character of theological reflection. He holds on

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the one hand that theological reflection should be distinctive in the sense that it should not be in conflict with current scientific knowledge (see the above quote). On the other hand the findings of the sciences should not be incorporated into Christian theology indiscriminately. He states:

A meaningful goal for the debate would be to clarify human-kind's apparently incorrigible religiosity, and to reconcile the substance of faith and the concomitant expectations with our understanding of the physical functioning of our cosmos. To highlight the irrationality of religion ... is easy. Pointing out misuses of religion is our duty; accepting religious 'malpractices' because they 'do no harm' is an insult to the human mind; hushing up scientific findings that appear to threaten religion is dishonest; denying the personal value that religion has for millions of human beings is a fallacy (Du Toit 2007:vi).

And:

Christianity offers countless plausible ways to accommodate belief in a personal god and personal salvation within the parameters of present-day technoscience. The science–theology debate has helped it to do so: not to devise new proofs of God's existence; not to sacrifice honesty in order to preserve religion; but to uphold the meaning that religion offers in a proficient manner (Du Toit 2007:vi).

His third contribution is his hermeneutical starting point of involvement with the theology–science debate, namely from the conviction that both science and theology are to be viewed in their cultural-historical contexts simply because both are influenced by their contexts. In this regard, Du Toit (2007b:70) writes:

The development of scientific theories cannot be detached from the cultural phase in which we find ourselves. The influence of cultural pluralism and openness is equally dominant in the progress of the natural sciences. Although the Newtonian laws remain valid, the context in which they are applied has changed. Hence it is not just physical phenomena and laws governing them that determine scientific interpretation, but also the interpretative framework in which it happens. The same facts are used to construct different stories. This gives the natural sciences the same narrative character as the human sciences.

And:

The intellectual history of the West shows how the history of science is interwoven with the rest of history, and therefore equally influenced by cultural changes (Du Toit 2007c:87).

Three important emphases by Du Toit to address the common clichés are: one multi-dimensional reality, one truth and the acknowledgement of the contextuality of all our reflection. In this article my engagement with him is restricted to two of his contributions to the science–theology debate. These are his recent unpublished paper *Immanent transcendence and the nature of life: developments from Schrödinger to Kauffman* (April, 2012) delivered in Tartu, Estonia, and his earlier brief exposition on life in *Values in the science–religion dialogue: biological roots of human nature and interaction with cultural environment* (Du Toit 2007a:15–44).

In the first one, *Immanent transcendence and the nature of life: developments from Schrödinger to Kauffman* (April 2012), Du Toit shows how reflection on life should be pursued and which direction the pursuit should take: he advocates a holistic approach<sup>2</sup> in a bio-century. Theological reflection is faced with the challenge of redefining the traditional answers to God as the source of all life. In addition he regards questions about being human as particularly meaningful because humans are created in God’s image. The subsequent subordination of all other organisms and non-human life forms to human life needs to be interrogated. In his second contribution, namely his exposition on life, Du Toit (2007:24) focuses on the biological roots of life-supporting values. Du Toit (2007:16) writes about a value-laden world in which the meaning of human life crystallises in the values people hold, the communities they make and the belief systems they live by.

In my conversation with Du Toit I focus only on one aspect of his aforementioned contributions, namely what specific theological contribution can be made to a redefinition of life by taking our biological roots seriously. I take to heart the latter part of his stern warning that this “does not mean that scientists must become priests of a new religion or theologians must become quasi-physicists” (Du Toit 2007:10). I do not want to become or be a quasi-physicist! My aim is to highlight the contribution of theology to the questions about life in conversation with Du Toit. I begin with a brief account of his argument for a redefinition of life. This account is followed by an outline of the contribution of theology to life. Lastly, I argue for the integration of the constitutive importance of affectivity with any effort to redefine life holistically.

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<sup>2</sup> On the term “holistical” Du Toit (2007b:82) writes: “A holistic approach entails integrating all of reality rather than one-dimensionality.”

### **Holistic redefinition of life**

Du Toit (2012:47) writes that the big challenge in our bio-century is to view the various accounts of what life is in a holistic context. It is to ask anew what life is since we are acutely, intuitively aware that new answers are needed. There is an ever-widening spectrum of reflection in the natural sciences (for example genome research), and this widening spectrum continuously challenges theological reflection on life as a gift from a creator God to redefine our very understanding of life. Traditional religious answers to questions about God as the source of all life, and about the meaning of being human and created in God's image (and about the subsequent subordination of all other nonhuman forms of life) (cf. Du Toit 2012:48) are in serious need of redefinition. The subordination mentioned and its anthropocentric basis have taken on life forms that threaten the survival of all life on earth. One of the most important findings in the natural sciences (specifically genome research) is the close link between all forms of life. Du Toit (2012:48ff) turns to two influential interpretations offered by Schrödinger and Kauffman respectively to assist us in our holistic redefining of life. These are redefinitions that take serious account of the interrelatedness of all life, and also of the physical premises and presuppositions that make life possible (cf. Du Toit 2012:48). The approach by Schrödinger is labelled a self-interpretation model; the approach by Kauffman unfolds from emergence theory. I briefly turn to these two approaches as put forward by Du Toit (2012:48ff).

According to Du Toit (2012:48) the significance of the self-interpretation model of the Austrian physicist Erwin Schrödinger (1887–1961) lies in the “new face that he gave to biology of his day ... by taking it into the domain of physics”. In short: Schrödinger built a bridge between physics and biology. In his book *What is life?* (1944),<sup>3</sup> Schrödinger addresses the problems of genetics, looking at the phenomenon of life from the point of view of physics and underscoring the unity of all existence. For Schrödinger, physics underlies all life. Whereas most physical laws appear chaotic on a micro scale, they become orderly on the macro level. For Schrödinger the same principle has to apply to life, that is, life has to be governed by some sort of code or distinctive principle (Du Toit 2012:50). The molecule that codes life, he argues, should be seen as a solid, more particularly a crystal (called an aperiodic solid). For Schrödinger the atoms that form a molecule are united by forces of exactly the same nature as the numerous atoms which build up a true solid, a crystal. In his exposition of Schrödinger's argument

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<sup>3</sup> In his exposition of Schrödinger's book *What is Life* (1944), Du Toit (2012:49) confusingly uses and refers to a much later 1992 publication of the book without any indication that the book was written almost 50 years earlier! Schrödinger's book *What is life?* was based on a course of public lectures he delivered in 1943 on invitation from the [Dublin Institute for Advanced Studies](#) at [Trinity College, Dublin](#).

Du Toit (2012:50) writes that this assumption is important because it is precisely this solidity on which we draw to account for the permanence of the gene. Schrödinger's viewpoint on the crystal (aperiodic solid) has become the basis for scientists – such as the discoverers of the structure of the DNA, James Watson and Francis Crick – who say that Schrödinger's work was their inspiration for unravelling the mysteries of information storage [genetic](#) .

What Du Toit does not mention in his exposition, however, is the important concluding philosophical remarks of Schrödinger (on [determinism](#), [free will](#), and the mystery of human [consciousness](#)). In these remarks he grapples to reconcile two of his basic convictions, namely that the body fully obeys the laws of quantum mechanics, where [quantum indeterminacy](#) plays no important role except to increase randomness at the quantum scale, and that there is "incontrovertible direct experience" that we freely direct our bodies, can predict outcomes and take responsibility for our choice of action. To reconcile his two basic convictions, Schrödinger (1944:32) proposes that "immediate experience as consciousness is a singular of which the plural is unknown". Schrödinger (1944:32) concludes that "... 'I' am the person, if any, who controls the 'motion of the atoms' according to the Laws of Nature". However, he also qualifies the conclusion as "necessarily subjective" in its "philosophical implications". In the final paragraph, he points out that what is meant by "I" is not the collection of experienced events, but the canvas upon which they are collected (cf. Schrödinger 1944:32). I will return to this "I as canvas" later.

According to Du Toit (2012:48) the significance of the approach of the American theoretical biologist and complex system researcher Kauffman (1939)<sup>4</sup> lies in his unfolding of emergence theory and the refusal to accept a direct line between matter and life. Kaufman's understanding of emergence includes factors like creativity, negative entropy, autopoietic and self-generating systems. Kauffman is best known for arguing that the complexity of biological systems and organisms might result as much from [self-organisation](#) and far-from-equilibrium dynamics as from Darwinian [natural selection](#). He is also known for applying models of [Boolean networks](#) to simplified genetic circuits. In his book *Reinventing the sacred* (2008), he claims that the biosphere cannot be deduced from the physical laws of the universe. Emergence, which is unique, unpredictable and unrepeatable, transcends natural law as it implies regularity, order and universality and

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<sup>4</sup> Stuart Kauffman is a professor at the University of Calgary with a shared appointment between biological sciences and physics and astronomy. He is also the leader of the University's Institute for Biocomplexity and Informatics (IBI), which conducts leading-edge interdisciplinary research in systems biology. He is an emeritus professor of bio-chemistry at the University of Pennsylvania, a MacArthur Fellow, and an external professor at the Santa Fe Institute. And he is one of the few scientists who dare to think outside the Darwinian box as well as the Galilean box! (Mohrhoff 2013).

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thus, according to Kauffman, becomes inapplicable. Du Toit (2012:53) quotes Kauffman's basic statements that biology cannot be reduced to physics, and that biology is both epistemologically and ontologically emergent. Epistemological emergence implies an inability to deduce or infer the emergent higher-level phenomenon from underlying physics. It is the idea that complex systems cannot be described, as a matter of practice, in terms of their component units because of our epistemic limitations or our inability to make the computations (Kauffman in Du Toit 2012:53). Ontological emergence has to do with what constitutes a real entity in the universe. A full understanding of complex systems in terms of their components is not possible in principle, not just because of practical considerations but because new levels of causality appear at higher levels of organisation (Du Toit 2012:53). According to Du Toit (2012:53), Kauffman's idea that physical reality needs to be augmented, is noteworthy. This "more-than-the-purely-physical" is given religious significance: it becomes the sacred (Du Toit 2012:53). And for Kauffman, this sacred dimension is creativity.

For Kauffman the evolution of the biosphere yields agency, value and consciousness. Since the biosphere cannot be reduced to the physical, these "things" cannot be reduced to the physical either (Mohrhoff 2013). Agency, in particular, means that we affect the evolution of the universe. Mohrhoff argues that there are phenomena that influence one another, thereby creating non-linear systems of equations that have no solution. Because the biosphere cannot be "predicted" deterministically, he points out that there is endless room for creativity. This is the view of the emergent universe. Another recurring theme is that of critical networks, poised between order and chaos that would maximise the chances of emergence and creativity. So the source of the endless creativity of the universe, the biosphere and the human mind is found in the physics itself, but is not reducible to it. Kauffman proclaims that science is not the only path to knowledge. His main objection to the materialistic scenario is that "values" are real features of the universe as much as particles (Mohrhoff 2013).

So much for Schrödinger and Kauffman. Or should it read: so little from Schrödinger and Kauffman? In my opinion their stunning contributions leave us with more exciting open questions than clear answers. Be that as it may, their contributions convincingly give a direction to explore and to go even further with their emphases on the interrelatedness of all of life; with the narrowing down of the ontological gap between human life and non-human life; and in taking account of our biological roots and of emergence in our perspectives on life. The important convincing thrust of their viewpoints is simply that they all point towards a holistic understanding of life in our biosphere. One specific emphasis by Du Toit (2012:48) is his incessant rejection of any attempt to reduce our understandings of life in any manner, whether based on scientific explanations (that is, the natural sciences that

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reduce life to the movement of a few atoms, electrochemical processes and so on) or on religious explanations (specifically metaphoric descriptions that are also reductive since they usually focus on just one aspect of a particular form of life). The basic reasons are that life entails “more than any physical explanation” (Du Toit 2012:48; cf Du Toit 2012:53) and the “... laws of chemistry and physics alone cannot explain the whole of life” (Du Toit 2012:49). He makes the following remark on Kauffman’s emergence approach: “Kauffman’s idea that physical reality needs to be ‘augmented’ is noteworthy. This ‘more-than-the-purely-physical’ is given religious significance: it becomes the sacred” (Du Toit 2012:53).<sup>5</sup>

In the second contribution of Du Toit (2007a:15-44) that I would like to take up, namely his *Values in the science–religion dialogue: biological roots of human nature and interaction with cultural environment*, he explores this “more-than-the-purely-physical” of the interpretations of life within the context of values. He writes: “The world we see is more than the physical reality around us. It is a world (cultural environment) constructed by human interpretation, co-determined by our specific culture, religion and society. This world is value-laden” (Du Toit 2007a:15). On this remark I would like to elaborate. For Du Toit (2007a:16ff), values are the underlying link in the science–religion dialogue and he emphasises that the importance of shared values in the two fields must be recognised. These values include both crucial epistemic values and value judgements that shape the way rationality functions in science and religion, as explained by Van Huyssteen (1997; 1998). It is from this perspective that his following remark must be understood:

The meaning of human life crystallises in the values people hold, the communities they make and the belief systems they live by. The emphasis on human beings as moral beings restores their place and dignity in the universe. From a human point of view the physical universe on its own is incomplete. It cannot explain itself. Human beings are built into the scheme of things in a very basic way (Du Toit 2007a:16).

And:

The world of values is pervasive and complex. Values may be as personal as one’s fingerprints or musical tastes, but may also be shared by many people. They may change, grow, be rejected and reinterpreted over time, but no era is imaginable without

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<sup>5</sup> For Kauffman, since we hold life to be sacred, this entails stepping towards the reinvention of the sacred as creativity in nature.



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values. Values are all-pervasive and influence our beliefs, decisions and feelings, directly or indirectly. They concern our subjective inner world but are also linked to reality 'outside' us ... Most values are transparent to us, unconsciously influencing our ideas and emotions. They operate intuitively and take on an emotional character ... Values judgements are based on value experiences, are often not logically explicable but are self-evident to those who hold them ... (Du Toit 2012:18–19).

Indeed. The physical universe on its own is incomplete. Human beings (or in this context perhaps 'personhood') are built into the scheme of things in a very basic way. To repeat Schrödinger's words: The "I as canvas". But how? Constitutive of this very basic way of being "built into" the scheme of things, is the acknowledgement of the constitutive affective-cognitive character of being human in making sense of life. Not only the cognitive dimension of the human animal is to be explored and not only the emphasis of being human as rational being should be our focus in making sense of our world, but the affective-cognitive dimension should also be interrogated. In this conversation with Du Toit, I will not further explore his exposition of the interpretation of a moral universe by, among others, George Ellis and Nancy Murphy.

Du Toit asks us to take up the challenge posed by the various accounts of what life is holistically in our bio-century. I would like to put forward an argument for an undervalued constitutive dimension of being human, of personhood, if we are to pursue a holistic viewpoint of the redefinition of life. This undervalued dimension is the affective-cognitive dimension. In my argument I will focus more strongly on the first part, namely the affective dimension. It is a dimension that Du Toit sometimes mentions (see quotes above), but only in passing and only in reference to "decisions and emotions" and "... emotional character". Affectivity (consisting of emotions, feelings and mood) is the very dimension that is either passed by politely, completely ignored or deliberately pushed aside because it is primitive and irrational<sup>6</sup> that must be integrated into our redefinition. In my argument, I align with Philip Clayton (2004:197), who writes the following in his exposition of integrating personhood:

... (H)uman existence in the world suggests that the conscious life – experiencing our most complex interrelationships, solving the most complex sorts of problems, synthesizing diverse dimensions into an integrated response or attitude – is accompanied by a higher-order affective state that is just as

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<sup>6</sup> To give but one influential example: From a Platonic perspective, emotions are seen as primitive and undifferentiated and must therefore be left behind "if the highest levels of human cognition are to appear in their pure form" (Clayton 2004:197).

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differentiated, as general, and as efficacious as the corresponding mental processes. This integrative state of the person thus has affective as well as intellectual and social dimensions.

In the next section I turn to this dimension of affectivity.

### **Contours of the redefinition**

Life is complex: it is surely more than the sum of its emergent parts. But what does the more consist of (Veldsman 2012)?

Another South African systematic theologian who, like Du Toit, takes the science–theology context seriously as vantage point for his redefinition of life, is Klaus Nürnberger (2012) in his *Dust of the ground and breath of life (Gen 2:7): the concept of 'life' in ancient Israel and emergence theory*. In his essay he investigates the concept of life in terms of ancient Israelite religion and modern emergence theory. According to Nürnberger (2012:148), the prescientific views do not clash with the theory of emergence. He pursues and explicates what Du Toit merely indicates as a plea for a holistic understanding of life and the “more-than-the-purely-physical” in a bio-century. Life is a mysterious gift of God. But how is this to be understood? Nürnberger states that emergence theory throws light on the more realistic Israelite concept of life as a *process* that involves structured matter and is subject to the constraints of time, space and energy.<sup>7</sup>

In his exposition of the concept of life in ancient Israel, Nürnberger (2012:147) firstly turns to the most basic religious belief about life, namely that life is a mysterious gift of God. The Genesis stories relate the mysterious origin of life, the gift of God, to a very specific act of God. God formed the human being from the soil of the field like a potter and then breathed the breath of life into “his” nostrils. Thus the human being became “a living creature” (Nürnberger 2012:147). Nürnberger (2012:147) argues that these hazy intuitions of a bygone age can be rendered more precise by modern science. This is what Nürnberger (2012:147-8) subsequently explicates in an insightful, integrated manner: According to Nürnberger, the structured “soil of the field” is energy conglomerations organised in a staggered hierarchy of emergences. The scientific equivalent of the “divine breath of life” is organisation and information systems that presuppose all lower levels of emergence, yet represent a superior level of complexity, volatility and potentiality (Nürnberger 2012:148). At some evolutionary stage, he continues, autocatalytic processes kick in. They produce trillions of complex systems

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<sup>7</sup> For Nürnberger (2012:146) this does not eliminate the difference between the scientific view of reality from within immanent reality and the believer’s view of the same reality from a transcendent perspective.

that function in perfect coordination. That is truly a mysterious gift of God (Nürnberg 2012:148). However, this intricately organised conglomeration of systems is highly vulnerable. The failure of one critical function can lead to the collapse of the entire system. Then it is all over and the organism disintegrates.

Of specific interest is Nürnberg's (2012:148–150) subsequent more detailed exposition of the experience of human life, which he characterises as complex and multidimensional. Nürnberg (2012:148–150) specifically refers to four Hebrew concepts in which it finds expression, namely *nephesh*, *basar*, *ruah* and *leb*. *Nephesh*<sup>8</sup> is usually translated as “soul”, but is also used to depict a “living creature” and thus a “human person”, specifically the *needy* human being; *basar*<sup>9</sup> is translated as “flesh” and refers to the *frail* human being; *ruah*<sup>10</sup> is translated as spirit and indicates the *empowered* human being; and *leb (lebab)*<sup>11</sup> is translated as “heart” or the *rational* human being. Nürnberg (2012:149–150) explains that *leb* represents human consciousness (insight, rationality, knowledge, thought, attention, interest and

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<sup>8</sup> Nürnberg (2012:148) writes that at the most basic level *nephesh* is the *throat* (the organ used for feeding the body) or the *trachea* (the organ used to breathe). In its widest sense *nephesh* denotes life itself. He elaborates on its spiritual dimension, namely that the person – as believer – can praise Yahweh for satisfying the hungry, thirsty, languishing or ‘breathless’ organism. However, the very same person that praises Yahweh is the person who experiences dependence, vulnerability and suffering: fear, fright, weakness, defencelessness, exhaustion, worry, anger, love, hatred, sorrow, impatience, but also satisfaction, joy, jubilation (Nürnberg 2012:148). Nürnberg links this interpretatively with the neural and chemical processes meant to lead to homeostasis, without which a healthy and pleasant life is not possible.

<sup>9</sup> The basic meaning of *basar* is ‘flesh’ or ‘meat’ – the meat of the sacrificial animal, or parts of the human body. Nürnberg (2012:149) explains that the meaning is extrapolated to the human body as a whole and further to include blood relations, the clan, fellow human beings and ultimately humanity.

<sup>10</sup> At the most basic level *ruah* means wind or storm (Nürnberg 2012:149). Applied to the human being, it is breath, understood as life-giving energy. As a metaphor, *ruah* is applied more often to God than to humans, denoting the *power* of God, in contrast to the ‘flesh’ (*basar*) characterised by creaturely frailty. However, *ruah* is not contemplated as such but as divine power *empowering* the human being. For Nürnberg (2012:149), *ruah* roughly fits the level of structured and oriented consciousness in emergence theory – the combination of emotional strength situated in the limbic system with the orientation and determination emanating from the prefrontal cortex. Its negative version can be compared with the egotistic survival instincts that have emancipated themselves from the control of the latter (Nürnberg 2012:149).

<sup>11</sup> Nürnberg (2012:149–150) explains that the translation of the concept *leb* as “heart” has nothing to do with either the biological organ that pumps blood through our bodies or the emotional sensitivity that we connect with the concept of the “heart”. It is believed to be something deeply hidden somewhere “within” the human being, probably inside the chest. He takes it to represent the seat of human consciousness and the person as responsible entity (Nürnberg 2012:149), and thus to be associated with insight, rationality, knowledge, thought, attention, interest and memory. In emergence terms it represents systems of synaptic switches that are formed by descent, early childhood socialisation, ongoing experience and continuing information (Nürnberg 2012:150).

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memory) and the human person as a responsible entity. At this point of his good exposition I start to raise my affective eyebrows! The affective in his description of *leb* is compartmentalised and politely pushed to the side. The same applies for his neat description of *ruah*, which is described in emergent terms as “emotional strength situated in the limbic system exposition”, and then not an affective word further. The affective dimension simply evaporates before our argumentative eyes. However, it is the very constitutive dimension of affectivity that we have to pursue within the bio-century by taking seriously the challenge to redefine life since, as Du Toit argues, we are acutely aware that new answers are needed to the question “What is life?”<sup>12</sup>

In most influential hermeneutical (theological) discourses worldwide, the theory-ladenness of all experience is acknowledged today (see Van Huyssteen 1997; 1998). Within the so-called bio-century challenge of a holistic redefinition of life, I would like to add the *affective dimension* to Du Toit’s directive of the “more-than-the-purely-physical”, of a “world constructed by human interpretation”, and also to Nurnberger’s theological-emergent proposal. In short: I wish to draw attention to the affective-ladenness of all experience and thus of rationality. I am convinced that in the “mind-heart” (affective-cognitive dimension) we find a constitutive dimension of being human, of personhood that enriches a holistic understanding of life in our bio-century. It is to re-emphasise and re-introduce that which many others have already noticed and which represents an integral part of the distinctive contribution that theological reflection can make to the science–theology dialogue. In the gripping words from *Pascal’s Pensées*<sup>13</sup> of the [French mathematician, physicist](#) and [Christian philosopher](#) Blaise Pascal (1623–1662):

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<sup>12</sup> Although I will not elaborate here on Buitendag’s (2012:28ff) contribution to reflection on understandings of life, it is important to take his critical viewpoint into account. He goes even further in his convincing argument that life cannot be described adequately only in terms of body (and/or spirit), or even in terms of the human person, but that the human being’s environment has to be sociologically and ecologically taken into account. He talks about the “indispensability” of “habitat” in our eco-theological definition of human life and adds that even the term “bio-cultural” has particular shortcomings (Buitendag 2012:34). In a much earlier publication, Philip Clayton (2004:198) raises the same concern, formulating it very differently: “As persons, and as social scientists, we ... have good reason to think that persons do in fact do things qua persons in the world.” I would also like to support this important emphasis.

<sup>13</sup> Pascal’s most influential theological work, referred to posthumously as the *Pensées* (“Thoughts”), was not completed before his death. The original title was *Apologie de la religion Chrétienne* (“Defense of the Christian religion”). The first version of the numerous scraps of paper found after his death appeared in print in 1669 and was entitled *Pensées de M. Pascal sur la religion, et sur quelques autres sujets* (“Thoughts of M. Pascal on religion, and on some other subjects”). I use the 1958 translated publication of his work by E.P. Dutton (publisher) of New York.

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The heart has its reasons, which reason does not know. We feel it in a thousand things. I say that the heart naturally loves the Universal Being, and also itself naturally, according as it gives itself to them; and it hardens itself against one or the other at its will. You have rejected the one, and kept the other. Is it by reason that you love yourself (Pascal 1958:78)?

And:

It is the heart which experiences God, and not the reason. This, then, is faith: God felt by the heart, not by the reason (Pascal 1958:79).

Does such an emphasis on the “heart” re-introduce irrationality into the dialogue (a common accusation made by John Locke, David Hume, René Descartes and others)? Yes, it does. On the one hand it re-introduces the heart in order to address the very accusation critically and, on the other hand, it introduces the heart to present us with a far richer, deeper (read: holistic) understanding of personhood. To respond to the accusation of irrationality we have to revisit viewpoints on emotion that understand emotion simply as an inner feeling or sensation that reflects only a physiological causal connection to the object (see Stoker 2006:166ff). In this sense, anger and hunger are to be understood as the same type of emotions. They are emotions that are not connected to an idea or judgement and therefore do not arise through a cognitive activity. Such an understanding of emotion leads to its characterisation as irrational. We have to take our vantage point from evolutionary biology that presents us with new facts about being human, among others that our emotions are rooted in our biological nature. Contemporary theories of emotions recognise the biological roots of our emotions and state that they consist of three different components. The three distinct components that can be distinguished are the (physiological and/or psychological) state of mind of someone who experiences an emotion, the object of the emotion and the relevant grounds for the emotion.<sup>14</sup> Emotions consist of physical and mental components. But there is more to affectivity than emotions. In his exposition of religious affectivity, Stoker (2006:178ff) argues convincingly, following Scheler, Strasser and Heron, that affectivity is layered and that mood (or

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<sup>14</sup> The following selection of articles and books can be mentioned as examples, although I have not explicitly made use of them in my exposition: W.P. Alston’s (1967: 479–86) article on “Emotion and Feeling” in *The encyclopedia of philosophy* (vol 2); A. Rorty’s (1980) *Explaining emotions*; R. de Sousa’s (1990) *The rationality of emotion*; R.C. Solomon’s (1993) *The passions: emotions and the meaning of life*; M. Nussbaum’s (2001) *Upheavels of thought: the intelligence of emotions*.

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disposition) precedes emotion.<sup>15</sup> The mood discloses our existence, that is “our thrownness in existence” (Stoker 2006:80). Mood, as pure feeling, represents our “finding of being in the world”, or a “felt state of mind, pure being-in-the-mood” (Strasser quoted by Stoker 2006:180). It is a property of our humanness that expresses our belonging to being.<sup>16</sup> Stoker’s viewpoint in this regard can be summarised by the following remark he made earlier:

Not only emotion but also mood influences our rational thought and our behaviour. The human being is a whole of *bios*, *pathos* and *logos*. Viewing affectivity as layered is an attempt to do justice to the different aspects of our humanness (Stoker 2006:179).

Mood (feelings of belonging) and emotions converge<sup>17</sup> with knowledge and action in the human heart (Stoker 2006:179). Feeling internalises knowledge and personalises reason, and does so in the heart. The heart thus unites what knowledge separates (Stoker 2006:184). In this qualified sense one can talk of the affective-cognitive dimension of personhood. If one then turns to religiosity, especially to explore the distinctive character and contribution of theological reflection within the science–theology debate, one finds that affectivity plays an important role in the Jewish and Christian religion. Here I diverge from Nürnberger’s exposition: the heart represents the seat of knowledge *and affectivity*. The biblical witnesses in all their various literary genres (historical witnesses, wisdom, psalms, parables and so on) tell of their experiences of transcendence and display a rich, deep, multifarious affective-cognitive dimension of personhood, from moods (belonging and not-belonging, trust and so on) to emotions (joy, sadness, hopelessness, fear and so on) that converge with knowledge (of life before and in God, and of the self) and with action in the human heart. The biblical witnesses tell of hearts that are hardened (such as Pharaoh), enlightened, lost and found. We read of the repeated promise that new hearts will replace old hearts, and many other heart-gripping stories. In this sense Pascal (1958:79) is then partially correct in remarking: “It is the heart which experiences God, and not the reason. This, then, is faith: God felt by the heart, not by the reason.” From contemporary hermeneutical discourses with the emphasis on all experience as theory-laden and thus experience as interpreted experience, I will qualify his

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<sup>15</sup> See Stoker’s (2006:180ff) elaboration on mood, especially its pre-intentional character.

<sup>16</sup> Stoker (2006:181) carefully formulates and differentiates: “This feeling of belonging to being is the ontological feeling. Just like a psychological feeling, it is affectively charged but differs from the former in that it indicates a property of our humanness: our connection with our (life) world. It is a basic feeling of the human being.”

<sup>17</sup> For a more detailed description of the reciprocal interaction between mood and emotions, see Stoker (2006:182). He writes about it poetically: “Moods supply the *leitmotif* of the song, whereas feelings such as emotions are the changing melody” (Stoker 2006:182).

remark as follows: it is the heart-mind which experiences God. This then is faith: God felt by the heart-mind.

To conclude: If we then take on the big challenge in our bio-century, as Du Toit (2012:47) wants us to do, to view the various accounts of what life is in a holistic context since we are acutely, intuitively aware that new answers are needed, then we will have to find answers with “hearts”. This briefly means that the “more-than-the-purely-physical” has hearts. In our holistic redefinition of life we have to take the affective-cognitive dimension of personhood seriously as constitutive of humanness. The distinctiveness of our theological contribution to the science–theology debate from our cultural-historical contexts as reflection of life as mysterious gift from God does not lie only in addressing the desire of Du Toit’s (2007:vi) heart that a “meaningful goal for the debate would be to clarify humankind’s apparently incorrigible religiosity”, but also in giving a heart to and demanding a heart from all contemporary scientific reflective endeavours in our bio-century.. In my opinion this concretely fulfils the (sense-making) need of affectively reading “the ‘more than’ into the story...” (Du Toit 2012:54) of human beings as beings of flesh and blood that have to live responsibly and carefully with all life on earth.

#### **Works consulted**

- Buitendag, Johan 2012. The indispensability of ‘habitat’ in our understanding of the human person. In search for an eco-theological definition of human life. ESSSAT Conference proceedings, Tartu, Estonia, 28–34.
- Clayton, Philip 2004. *Mind and emergence*. Oxford: Oxford University Press.
- Du Toit, Cornel W. 2007. *Viewed from the shoulders of God. Themes in science and theology*. Pretoria: Research Institute for Theology and Religion, Unisa.
- Du Toit, Cornel W. 2007a. Values in the science–religion dialogue: biological roots of human nature and interaction with cultural environment, in Du Toit, C.W., *Viewed from the shoulders of God. Themes in science and theology*. Pretoria: Research Institute for Theology and Religion, Unisa, 15–44.
- Du Toit, Cornel W. 2007b. Common ground between science and theology, in Du Toit, C.W., *Viewed from the shoulders of God. Themes in science and theology*. Pretoria: Research Institute for Theology and Religion, Unisa, 67–82.
- Du Toit, Cornel W. 2007c. Dominant scientific and technological worldviews: Christian responses, in Du Toit, C.W., *Viewed from the shoulders of God. Themes in science and theology*. Pretoria: Research Institute for Theology and Religion, Unisa, 83–106.

*The bio-century challenge: life in a holistic context. ...*

- Du Toit, Cornel W. 2012. Immanent transcendence and the nature of life: developments from Schrödinger to Kauffman. ESSSAT Conference proceedings, Tartu, Estonia, 47–56.
- Kauffman, Stuart 2008. *Reinventing the sacred*. Basic Books: New York.
- Mohrhoff, U. 2013. Review of: Stuart A. Kauffman's *Reinventing the sacred: a new view of science, reason, and religion*. Available: <http://anti-matters.org/articles/83/public/83-76-1-PB.pdf>. Accessed: May 2013.
- Nürnbergger, Klaus 2012. Dust of the ground and breath of life (Gen 2:7): the concept of 'life' in ancient Israel and emergence theory. ESSSAT Conference proceedings, Tartu, Estonia, 146–151.
- Pascal, Blaise 1958. *Pascal's Pensées*. New York: Dutton. Available: <http://www.gutenberg.org/files/18269/18269-h/18269-h.htm#p>. Accessed: May 2013.
- Polkinghorne, John & Welker, Michael (eds.) 2000. *The end of the world and the ends of God*. Harrisburg: Trinity Press.
- Schrödinger, Ervin 1944. What is life? Available: [http://whatislife.stanford.edu/LoCo\\_files/What-is-Life.pdf](http://whatislife.stanford.edu/LoCo_files/What-is-Life.pdf). Accessed: May 2013.
- Stoker, Wessel 2006. *Is faith rational?* Peeters: Leuven.
- Van Huyssteen, Wentzel 1997. *Duet or duel*. Harrisburg: Trinity Press.
- Van Huyssteen, Wentzel 1998. *Essays in postfoundationalist theology*. Cambridge: Eerdmans.
- Veldsman, Daniël P. 2012. Life is what? On “givenness” and “sensemaking” within the context of the theology2science dialogue. ESSSAT Conference proceedings, Tartu, Estonia, 225–236.



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